ARONOVICH, V. M.; PRAVDYUK, N. F.

"Behavior of fuel under irradiation."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

PRAVDYUK, N. F.; KONOBEYEVSKIY, S. T.; ORLOV, M. L.

"Effect of some factors on hydrogenization and properties of zirconium alloys used for Jackets of heat-producing elements in water cooled power reactors."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

L 8571-66 EPF(n)-2/EWA(h)/EWP(z)/EWP(b)/T/EWT(m)/EWA(d)/EWP(w)/EWP(t) IJP(c)
ACC NR: AT5023782 GG/WW/JD SOURCE CODE: UR/0000/62/000/000/0034/0057

AUTHOR: Pravdyuk, N. F.; Amayev, A. D.; Platonov, P. A.; Kuznetsov, V. N.; Golyanov, V. M. 44, 55 44, 55 44, 55 44, 55

ORG: none

TITLE: Effect of neutron irradiation of the properties of structural materials

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 34-57

TOPIC TAGS: neutron irradiation, structural material, low carbon steel, low alloy steel, austenitic steel, steel property, zirconium alloy, alloy property, radiation damage

ABSTRACT: The effect of irradiation of the mechanical properties of low-carbon steels, low-alloy steels, austenitic steels, and zirconium alloys has been investigated at the Institute of Atomic Energy im. I. V. Kurcharov, to determine their suitability as structural materials for use in reactors. Irradiation of low-carbon steel with a flux of 10^{19} or 10^{20} neutron/cm^2 at 160—200C increased the steel yield strength and tensile strength, but substantially decreased ductility. For example, the elongation of low-carbon steel drops 25—50% after irradiation with 10^{19} neutron/cm^2. Certain conditions of irradiating low-carbon ferrite or ferritic-pearlitic steels

Card 1/2

L 8571-66

ACC NR: AT5023782

change their properties to such an extent that their utilization in reactors involves a risk. Toughness and NDT temperature, not strength, determine the fitness of materials for use in reactor vessels. Irraditation of steels at temperatures under 250C with a 10^{18} neutron/cm^2 flux causes some changes in their mechanical properties; a 10^{20} neutron/cm^2 flux induces the maximum change (this is especially pronounced in stainless austenitic steels). Irradiation at temperatures above 400C has virtually no effect on the mechanical properties of structural materials. Stainless austenitic steels and nickel-chromium-iron alloys irradiated at 100C maintain satisfactory ductility (elongation of at least 20%). Austenitic steels and zirconium and its alloys, cold worked prior to irradiation, combine strength with moderate ductility (elongation of at least 10%). Low-carbon steel, low-alloy steels, and other materials, with a relatively high content of boron after irradiation, become brittle; their elongation after irradiation with 10^{20} neutron/cm^2 is low. However, under conditions of low irradiation, the utilization of these low-carbon and low-alloy steels at low temperatures is admissable. In making thickwall reactor vessels from these steels, the NTD temperature is the main factor for determining the acceptable irradiation dose. Orig. art. has: 19 figures and 3 tables. [ND]

SUB CODE: 11, 18/ SUBM DATE: 18Aug62/ ORIG REF: 005/ OTH REF: 001

jw

Card 2/2

L 9235-66 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(h)/
ACC NR: AT5023783 EWA(c) MJW/JD/HM/GG/ GS SOURCE CODE: UR/0000/62/000/000/0058/0067

AUTHOR: Amayev, A. D.; Yefimov, A. V.; Platonov, P. A.; Pravdyuk, N. F.; Razov, I.A.; Khlebnikov, A. M.

ORG: none

TITLE: Effect of neutron irradiation on the mechanical properties of heat-resistant ferritic-pearlitic steels and on their welded joints

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveschaniya. Moscow, Izd-vo AN SSSR, 1962, 58-67

TOPIC TAGS: ferritic pearlitic steel, neutron irradiation, steel irradiation, steel property, weld property/25Kh2MFA steel, 12Kh2MFA steel

ABSTRACT: The effect of neutron irradiation on the mechanical properties of ferritic-pearlitic steels and their welded joints has been investigated. Specimens of annealed and tempered 25Kh2MFA and 12Kh2MFA chromium-molybdenum-vanadium steels with 0.2% and 0.1% C, respectively, were irradiated at 80—305C with integrated neutron fluxes of 2.8×10^{17}—7.2×10^{19} n/cm^2 (35% of neutrons with energy > 1). Mechanical tests of both steels and of 12Kh2MFA steel welds showed that neutron irradiation increases strength and decreases ductility and notch toughness, but not as much as in 25KhNM steel or 20 steel irradiated under the same conditions. This shows that metal strengthened by means of alloying or heat treatment, plastic

Card 1/2

L 9235-66

ACC NR: AT5023783

3

deformation or dispersion hardening is less sensitive to irradiation. The mechanical properties of 12Kh2MFA steel welds obtained by manual or automatic welding with 12KhMF or 12KhM electrode wires undergo practically the same change as the base metal when irradiated with a $7 \cdot 10^{19}$ n/cm^2 flux. However, this change is slightly more pronounced in welds obtained with 12KhM wire, owing to its lower content of alloying elements. Increasing the temperature of irradiation decreased the radiation damage in all tested steels and diminished the degree of change in mechanical properties, because the damage is partially or completely eliminated by annealing. The highest temperatures at which no change of mechanical properties of ferritic-pearlitic steels and their welds occurs under effect of irradiation with neutron flux of the indicated intensity are 350—400C. At an irradiation temperature of 100C, none of the tested steels attains the highest values of strength, ductility, and toughness, unless the flux of fast neutrons is 10^{20} n/cm^2. Orig. art. has: 9 figures and 4 tables.

[ND]

SUB CODE: 11, 20/ SUBM DATE: 18Aug62/ ORIG REF: 003

Card 2/2

L 10800-66 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(h) IJP(c)
ACC NR: AT5023784 MJW/JD/JG/GG/GS SOURCE CODE: UR/0000/62/000/000/0068/0073

AUTHOR: Yefimov, A. V.; Kozhevnikov, O. A.; Nikolayev, V. A.; Pravdyuk, N. F.; Razov, I. A.; Khlebrikov, A. M.

ORG: none

TITLE: Effect of neutron irradiation on the mechanical properties of stainless austenitic steels of various strength

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962. 68-73

TOPIC TAGS: austenitic steel, austenitic alloy steel, neutron irradiation, steel irradiation, steel property

ABSTRACT: The effect of neutron irradiation on the mechanical properties of stainless austenitic steels has been investigated. 1Kh18N9T steel austenitized at 1000C or austenitized at this temperature and cold rolled with 25% elongation, and austenitic, dispersion-hardenable, chromium-nickel steel of the 18-22 type, alloyed with tungsten and titanium, were irradiated with integrated fluxes of 7.4×10^{20} or 2×10^{20} n/cm^2 with energy > 1Mev at 100C, 300C, or 500C. Tests showed that irradiation of austenitized 1Kh18N9T steel at 100C with 7.4×10^{19} n/cm^2 increases the yield and tensile strengths by 101% and 24%, respectively, and decreases the elongation and

Card 1/2

L 10800-66
ACC NR: AT5023784

notch toughness by 39% and 20%. The same irradiation increases the yield and tensile strengths of austenitized and cold-rolled 1Kh18N9T steel only by 27% and 21%, and decreases its elongation and notch toughness by 38% and 42%. Increasing the irradiation intensity from 7.4×10^{19} to 2.10^{20} n/cm^2 has no effect on the properties of this steel. Increasing the temperature of irradiation with 7.4×10^{19} n/cm^2 from 100 to 300 to 500C decreases the yield strength of austenitized and cold-rolled steel by 11% and 30% below that of steel irradiated at 100C. The tensile strength drops in this case by 4 and 17%, but the elongation increases by 44 and 148%. The mechanical properties of stainless chromium-nickel steel alloyed with tungsten and titanium and austenitized and aged at 710C for 10 hours, do not change much under the effect of fast-neutron irradiation at $2\ 10^{20}$ n/cm^2, except for the yield strength, which increases by 30%. Orig. art. has: 4 figures and 2 tables. [ND]

SUB CODE: 13, 20 SUBM DATE: 18Aug62/ ORIG REF: 003/ OTH REF: 008

Card 2/2

L 10797-66 EWT(l)/EWT(m)/EPF(n)-2/T/EWP(t)/EWP(z)/EWP(b)/EWA(h)/EWA(c) IJP(c)
ACC NR: AT5023791 SOURCE CODE: UR/0000/62/000/000/0136/0152
JD/WW/HW/JG/GG/GS

AUTHOR: Ivanov, A. N.; Pravdyuk, N. F.

ORG: none

TITLE: Effect of neutron irradiation on the electric resistivity of some metals

SOURCE: Soveshchaniye po probleme deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 136-152

TOPIC TAGS: iron, nickel, titanium, iodide zirconium, molybdenum, tungsten, neutron irradiation, metal electric resistivity, neutron irradiation effect

ABSTRACT: The Atomic Energy Institute im. I. V. Kurchatov has investigated the effect of neutron irradiation at 40—50C on the electric resistivity of commercial-grade iron, nickel, titanium, iodide zirconium, molybdenum, and tungsten. The metals in the as-rolled and annealed conditions were irradiated with a flux of 2.0—2.5 x 10^{13} n/cm^2·sec (thermal) and about 2.0—2.5 x 10^{12} n/cm^2·sec fast neutrons with an energy of more than 1 Mev. A method developed by the authors

Card 1/5

L 10797-66

ACC NR: AT5023791

Table 1. Relative change in the electric resistivity of various metals depending on the integrated flux.

Materials	Preliminary treatment	Electrical resistivity prior to irradiation at 20C, 10^6 ohm·cm	Change in the electric resistivity (%) at an integrated flux of 10^{20} n/cm^2 (thermal)*		
			1,3	2,25	2,9
Iron	Annealing at 700C, 1 hr	14,94	2,6±0,3	4,0±0,1	4,8±0,1
	Reduction up to 94%	15,51	2,1±0,2	3,7±0,1	4,4±0,5**
Nickel	Annealing at 700C, 1 hr	9,12	2,9***	4,6±0,1	4,9±0,1
	Reduction up to 92.5%	9,41	1,1±0,2	2,7±0,1	3,1±0,1
Zirconium	Annealing at 1000C, 1 hr	48,96	3,6±0,6	6,1±0,3	7,6±0,1
	Reduction up to 95.5%	51,63	3,0±0,3	4,3±0,3	4,6±0,2
Titanium	Annealing at 1000C, 1hr	60,63	1,7±0,4	3,0±0,1	4,0±0,1
Molybdenum	Annealing at 1000C, 1hr	5,99	12,6±1,7**	22,3±0,45	25,3±0,3
Tungsten	Annealing at 1000 C, 1 hr	6,10	47,3±10,3	94±1,4**	28,9±0,4**** 121±12****

* Fast neutron flux constituted about 10% of thermal neutrons
** The average from two specimens
*** Single specimen
**** Specimens were irradiated at 40--50C with an integrated flux of $2.6 \cdot 10^{20}$ n/cm^2 thermal

Card 2/5

L 10797-66

ACC NR: AT5023791

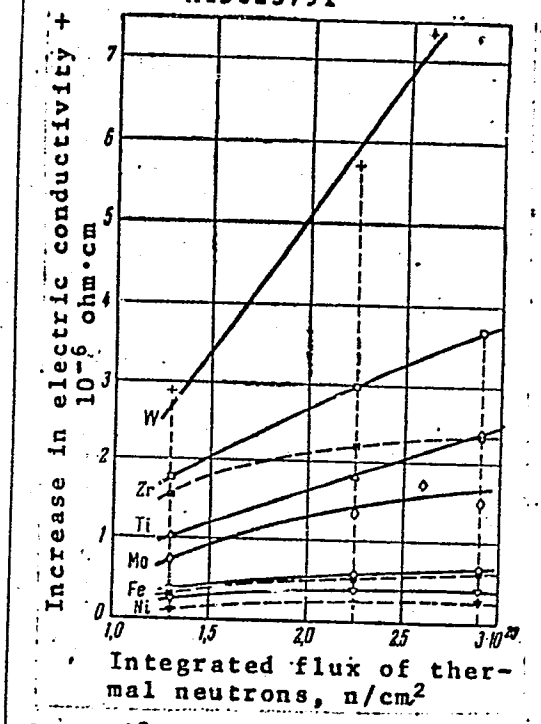


Fig. 1. Dependence of the electric resistivity of metals on the integrated flux.

The calculated flux of fast neutrons (E > 1 Mev) constituted 10% of the thermal neutron flux. Dashed line shows the dependence for specimens irradiated in the as-rolled condition. Solid line shows specimens annealed before irradiation.

Card 3/5

for the remote measurement of the electrical resistivity of metals during irradiation in the reactor was used in the experiments. Results of the measurements are shown in Fig. 1 and Table 1. To determine the nature of the irradiation defects, the kinetics of the change in the resistivity of the metals irradiated with various integrated fluxes was investigated by means of isochronal annealing. It was found that the removal of the irradiation-induced increase in the resistivity of titanium, zirconium, and iron irradiated in the annealed conditions proceeded in a single stage and was complete at 210—290, 300—400, and 350C for Ti, Zr, and Fe, respectively. This seems to indicate annealing not of elementary, but of more complex defects. In rolled irradiated and unirradiated iron, the removal of the resistivity increment proceeded in two stages: the first at 100—250C, associated with the release of simple defects from traps, and the second at 250—550C, associated with the rearrangement of dislocations. The decrease of the irradiation-induced increase in resistivity in irradiated molybdenum and tungsten also proceeded in two stages: at 100—250 and above 450C in molybdenum and at 100—375 and 375—1000C in tungsten. The low-temperature stage of the decrease appears to be associated with

L 10797-66

ACC NR: AT5023791

the migration of defects trapped by other imperfections of the crystal lattice or by impurity atoms, and the high-temperature stage with the annihilation of more complex defects. [MS]

SUB CODE: 13,20 SUBM DATE: 18Aug62/ ORIG REF: 000/ OTH REF: 015

Card 5/5

L 8573-66 EPF(n)-2/EWT(l)/EWT(m)/T/EWP(b)/EWA(h)/EWP(w)/EWP(t) IJP(c) GG/JD

ACC NR: AT5023792 SOURCE CODE: UR/0000/62/000/000/0153/0159

AUTHOR: Pravdyuk, N. F.; Platonov, P. A.

ORG: none

TITLE: Investigation of the rupture strength of copper after irradiation

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 153-159

TOPIC TAGS: copper, fast neutron irradiation, neutron irradiated copper, copper rupture strength, irradiation effect

ABSTRACT: Commercial copper was irradiated with a fast neutron flux of about 10^{20} n/cm^2 at 80C. Then both unirradiated and irradiated copper were subjected to stress-rupture tests at 200—300C at stresses varying from 4 to 19 kg/mm^2. The rupture life in irradiated and unirradiated copper decreased linearly as stress increased. Under identical stresses and temperatures, the rupture life of irradiated copper was many times longer than that of unirradiated. Investigation of the rupture life-temperature dependence showed that the failure of both unirradiated and irradiated copper occurred with an identical value of the activation energy, which decreased with increasing stress. Analysis of the data obtained showed that the failure of copper in both states occurred with the same mechanism. Presumably, the

Card 1/2

I 8573-66

ACC NR: AT5023792

rupture life would increase with irradiation at low temperatures, when diffusion processes play an insignificant role and the rupture life is determined mainly by the intensity of the formation of vacancies resulting from plastic deformation during irradiation. It can then be expected that at temperatures equal to or higher than the melting temperature and at lower stresses (consequently, at a longer rupture life) irradiation will shorten the rupture life. This circumstance, however, requires experimental verification. Orig. art. has: 5 figures and 3 tables. [MS]

SUB CODE: 11,18/ SUBM DATE: 18Aug62/ ORIG REF: 003/ OTH REF: 001

jw

Card 2/2

L 8158-66 EPF(n)-2/EWT(d)/EWT(m)/EWP(z)/EWP(b)/T/EWA(d)/EWP(w)/EWI(t) IJP(c)
ACC NR: AT5023801 EM/GG/MJW/JD/HW/GS SOURCE CODE: UR/0000/62/000/000/0219/0234

AUTHOR: Konobeyevskiy, S. T. (Corresponding member AN SSSR); Pravdyuk, N. F.; Pokrovskiy, Yu. I.; Vikhrov, V. I.

ORG: none

TITLE: The effect of neutron irradiation on the internal friction of metals

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 219-234

TOPIC TAGS: copper, aluminum, magnesium, chromium steel, nickel containing steel, metal internal friction, metal fatigue, neutron irradiation, irradiation effect

ABSTRACT: The internal friction (1/Q) and the normal elasticity modulus have been investigated in solution-heat-treated copper, aluminum, and magnesium prior to and after irradiation at 80C with an integrated flux of 2.0×10^{16}—5.0×10^{20} thermal n/cm^2 (the number of fast neutrons with an energy of more than 1 Mev was 35%). The 1/Q was measured at a stress of 2—20,000 g/mm^2. The plotted internal friction-strain amplitude curves showed the existence of a critical strain (σ_{cr}) under which the 1/Q begins to be affected by the applied stress. The 1/Q and σ_{cr} were found to be very sensitive to irradiation (see Fig. 1.). For example, the σ_{cr} for irradiated copper increased 280 times and the minimum value of 1/Q decreased by two times compared with the initial value before irradiation. The changes in the value of 1/Q and

Card 1/3

0902 0208

L 8158-66

ACC NR: AT5023801

σ_{cr} with irradiation doses equal to or less than 10^{17} n/cm^2 are caused by the interaction of dislocations and point defects which resulted from elastic scattering of neutrons. In the case of plastic deformation of up to 27%, the point defects resulted from interaction between dislocations, and the increase in the value of 1/Q was considerably smaller. In distilled magnesium subjected to fatigue with a cyclic stress of various amplitude before irradiation with an integrated flux of 10^{19} n/cm^2 (thermal neutrons and about 10% fast neutrons with an energy above 1 Mev), the value of σ_{cr} was found to increase from the initial 5 g/mm^2 to 100 g/mm^2 after irradiation. In fatigue testing under a cyclic stress of 1600—4500 g/mm^2, distilled magnesium irradiated with an integrated flux of 10^{19} n/mm^2 (thermal) had an endurance limit 10% higher than unirradiated magnesium. The effect of irradiation on the natural vibration frequency of specimens (the square of which determines the normal elasticity modulus) was investigated on irradiated copper and unirradiated 1Kh18N9T [AISI 321] stainless steel. The observed irradiation-induced behavior of the normal elasticity modulus can be explained by a manifestation of both the elastic and "nonelastic" properties of the metal, depending on the magnitude of the stress applied in dynamic measurement of the modulus. The "nonelastic" properties of the metal can be caused by migration of dislocations, while pure elastic properties manifest themselves only in the region of stresses $\sigma \leq \sigma_{cr}$.

Card 2/3

L 3158-66

ACC NR: AT5023801

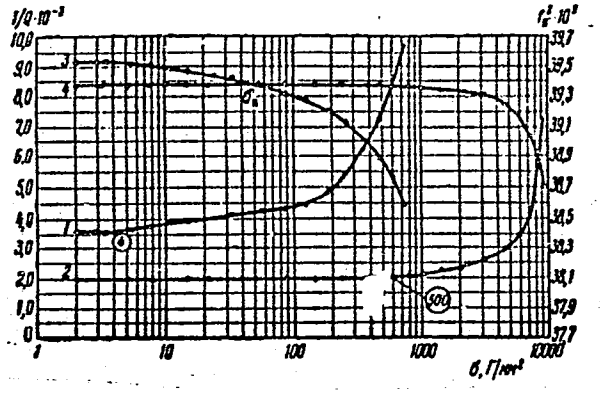


Fig. 1. Dependence of the internal friction and the square of natural vibration frequency of copper before and after irradiation on stress amplitude.

1 - Internal friction before irradiation; 2 - after irradiation; 3 - square of the natural frequency before irradiation; 4 - after irradiation.

Hence, the irradiation-induced changes in the normal elasticity modulus can be studied only at the above stresses. Orig. art. has: 16 figures. [MS]

SUB CODE: MM,SS/ SUBM DATE: 18Aug62/ ORIG REF: 002/ OTH REF: 001/

jw

Card 3/3

L 9238-66 EWT(d)/EWT(l)/EWT(m)/EWP(w)/EPF(n)-2/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/
ACC NR: AT5023802 EWA(h)/EWA(c)/ETC(m) SOURCE CODE: UR/0000/62/000/000/0235/0241
JD/WW/EM/GG/GS

AUTHOR: Pravdyuk, N. F.; Pokrovskiy, Yu. I.; Vikhrov, V. I.

ORG: none

TITLE: Effect of neutron irradiation on the internal friction of zinc monocrystals and polycrystals

SOURCE: Soveshchaniye po probleme Deystviye yadernykh izlucheniy na materialy. Moscow, 1960. Deystviye yadernykh izlucheniy na materialy (The effect of nuclear radiation on materials); doklady soveshchaniya. Moscow, Izd-vo AN SSSR, 1962, 235-241

TOPIC TAGS: irradiation, neutron irradiation, zinc single crystal, zinc polycrystal, internal friction

ABSTRACT: Zinc single crystals and polycrystals with various base plane angles and with orientation angles of 15, 46, 66, 76, 86, and 88° were irradiated with integrated fluxes of 3×10^{18} or 1.5×10^{19} n/cm^2, and the effect of irradiation on the internal friction was investigated. Results of investigations showing changes of internal friction, which are produced by the maximum strain amplitude (σ_{cr}), at which the internal friction begins to depend upon it, in zinc single crystals and polycrystals with or without applying neutron irradiation are shown in Figs. 1—6.

Card 1/7

L 9238-66
ACC NR: AT5023802

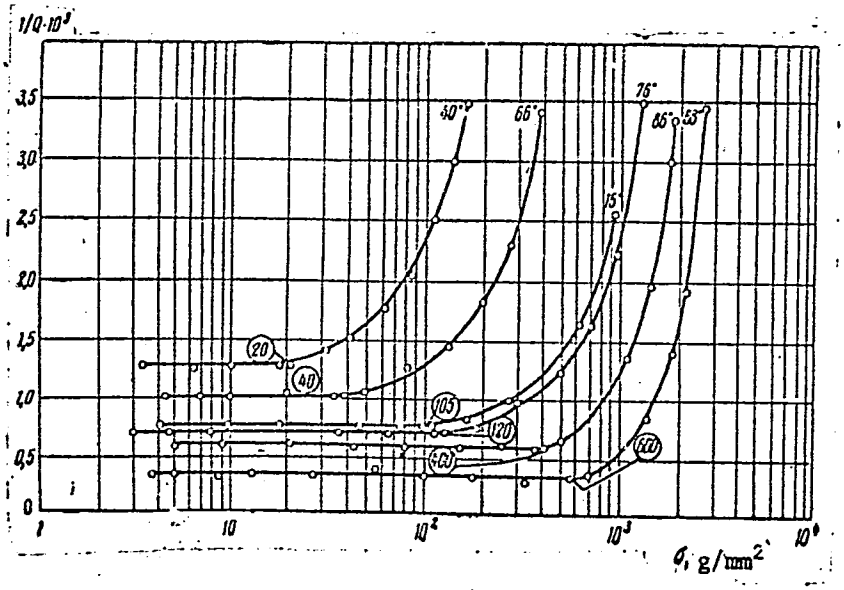


Fig. 1. Internal friction change induced by strain amplitude of unirradiated zinc single crystals with orientation angles of 15, 40, 66, 76, 86, and 88° at base plane 0001 (the values of σ_{cr} are shown on the curves)

Card 2/7

L 9236-66

ACC NR: AT5023802

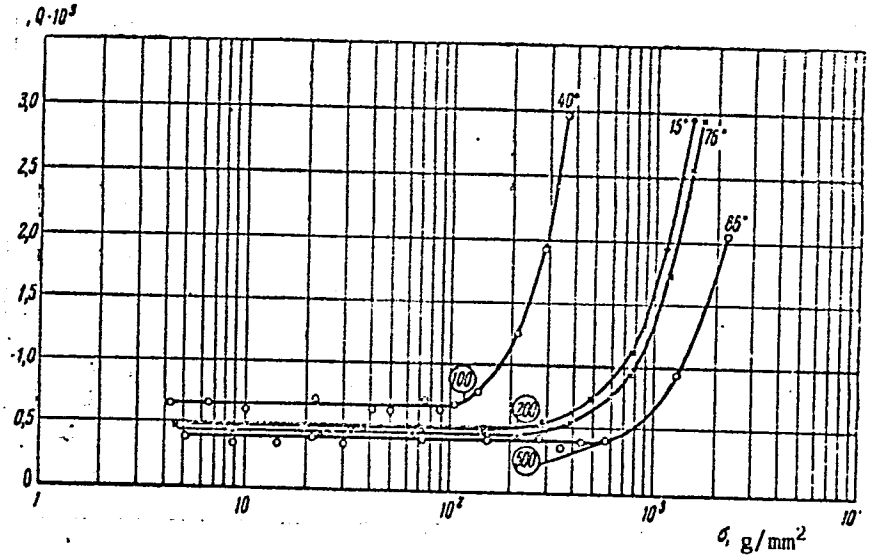


Fig. 2. Internal friction change induced by strain amplitude of zinc single crystals with orientation angles of 15, 40, 76, and 86° at base plane 000, which were irradiated with a flux of 3×10^{18} n/cm^2 (the values of σ_{cr} are shown on the curves)

Card 3/7

L 9238-66

ACC NR: AT5023802

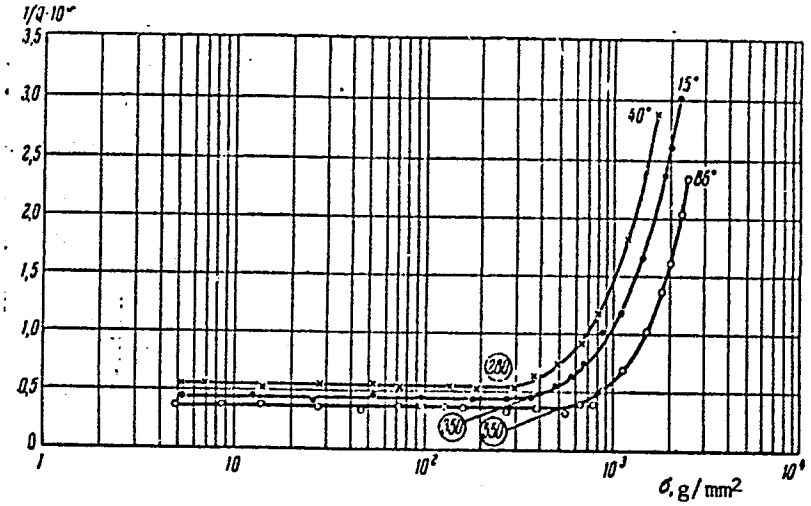


Fig. 3. Internal friction change induced by strain amplitude of zinc single crystals with orientation angles of 15, 40, and 86° at base plane 0001, which were repeatedly irradiated with a flux up to 1.5×10^{19} n/cm^2 (the values of σ_{cr} are shown on the curves)

Card 4/7

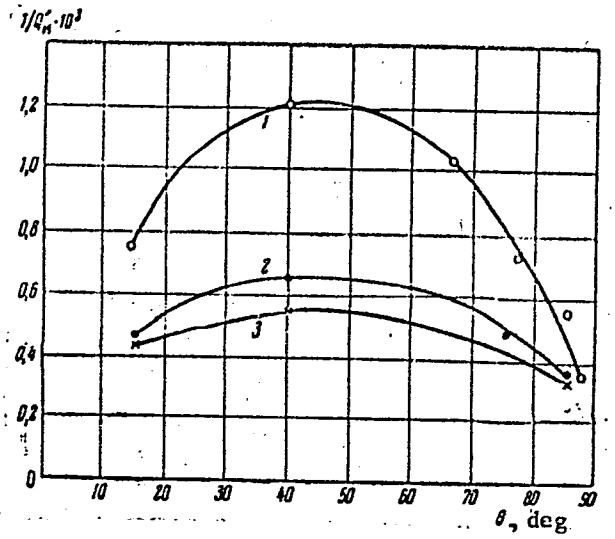


Fig. 4. Minimum internal friction change of zinc single crystals, which depends upon orientation angle at base plane 0001

1 - Before irradiation; 2 - after irradiation with a flux of 3×10^{18} n/cm^2; 3 - after repeated irradiation with fluxes up to 1.5×10^{19} n/cm^2.

L 9238-66
ACC NR: AT5023802

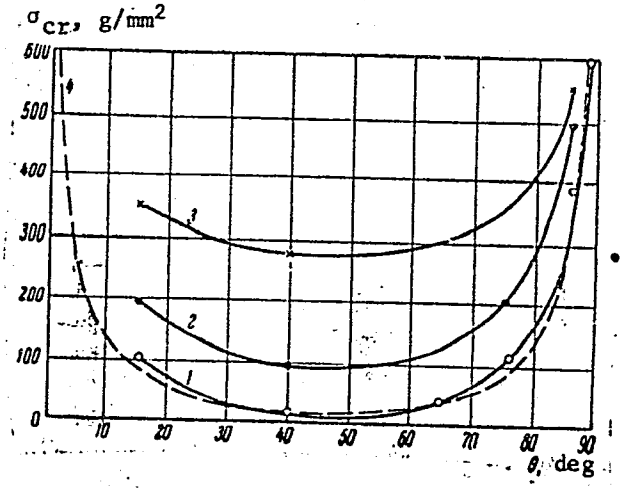


Fig. 5. Change in σ_{cr} before and after irradiation of zinc single crystals, which depends upon orientation angle at base plane 0001

1 - Before irradiation (experimental curve); 2 - after irradiation with a flux of 3×10^{18} n/cm^2; 3 - after repeated irradiation with fluxes up to 1.5×10^{19} n/cm^2; 4 - before irradiation (theoretical curve).

Card 6/7

L 9238-66
ACC NR: AT5023802

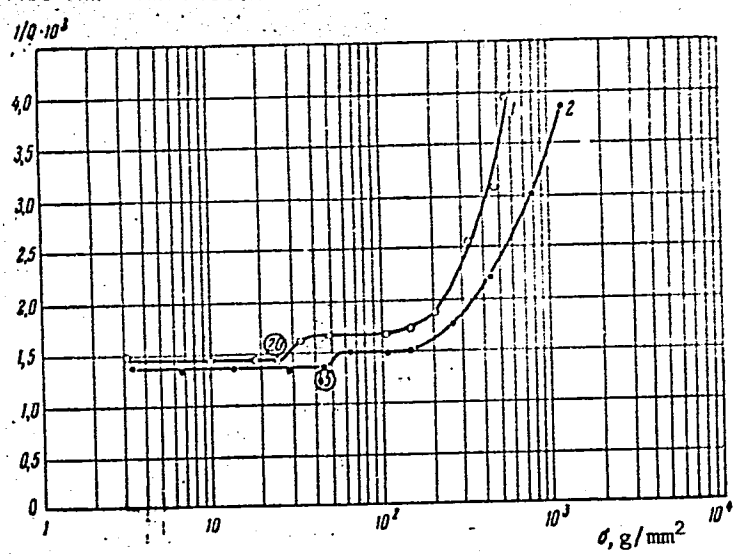


Fig. 6. Internal friction change induced by strain amplitude before and after irradiation of zinc polycrystal.

1 - Before irradiation (σ_{cr} = 26 g/mm^2); 2 - after irradiation with flux of 3 x 10^{18} n/cm^2 (σ_{cr} = 45 g/mm^2).

Orig. art. has: 7 figures and 3 formulas. [ND]

SUB CODE: 20/ SUBM DATE: 18Aug62/ ORIG REF: 001/

Card 7/7

L 53943-65 EWT(m)/EPF(c)/EPF(n)-2/EWG(m)/EPR/EWA(h) Pr-4, Ps-4/Pu-4 WW

ACCESSION NR: AT5013238 UR/3119/64/000/002/0051/0064

42
40
B+1

AUTHOR: Pravdyuk, N. F.; Ivanov, V. P.; Kuznetsov, V. N.; Vikhrov, V. I.; Perevezentsev, V. N.

19

TITLE: Measurement of fast neutron flows using threshold reactions during experiments on irradiation of materials in the RFT reactor

19

SOURCE: AN LatSSR. Institut fiziki. Radiatsionnaya fizika, no. 2, 1964. Dozimetriya neytronov i gamma-luchey (Dosimetry of neutrons and gamma rays), 51-64

TOPIC TAGS: fast neutron flux, threshold reaction, neutron registration, neutron flux measurement, reactor neutron flux, radiation dosimetry

ABSTRACT: The authors studied the problem of absolute measurements of integral fluxes of fast neutrons using the threshold reactions

$$U^{238}(n, f);\ P^{31}(n, p)Si^{31};\ S^{32}(n, p)P^{32};$$

$$Ni^{58}(n, p)Co^{58};\ Cl^{35}(n, \alpha)P^{32};\ Al^{27}(n, \alpha)Na^{24}$$

in the channels of the RFT reactor. The absolute isotope activity was measured by means of a 4π flow-through type counter, a 4π slit scintillation counter, the β-γ coincidence method, γ-spectrometers, and by calibrated proportional and crystal

Card 1/3

L 53943-65
ACCESSION NR: AT5013238

counters with layers of fissionable material. The distribution of fast and thermal neutrons within the active zone was determined according to the relative method by means of fission counters and sulfur and copper activation. The article outlines the theory of the experiments, describes the experimental method, and reports the results of the measurements. The methods used for the flux determination during the present investigation are quite complex and cumbersome and the success of any such measurement hinges to a great extent on the knowledge of the shape of the spectrum at various points within the reactor. Consequently, the authors suggest that the theoretically calculated spectra be used whenever possible. If the neutron spectrum for a point in the reactor is calculated reasonably accurately, a single threshold indicator is sufficient for its empirical normalization. If the accuracy of the calculation is in doubt, it can be checked and corrected by means of a series of threshold indicators (see, R. Nilson, Neutron dose monitoring for irradiation of materials in reactors. Contributions to the Harwell Symposium in December 1962, No SM 36/42; J. Moteff, Nucleonics, 20, 1962, 12, 56). "In conclusion, the authors thank Yu. G. Nikolayev and his co-workers for calculating the neutron spectra and for practical help in carrying out the experiments." Orig. art. has: 9 formulas, 5 figures, and 3 tables.

Card 2/3

L 53943-65
ACCESSION NR: AT5013238

ASSOCIATION: Ordena Lenina Institut atomnoy energii im. I. V. Kurchatova (Order of Lenin Institute of Atomic Energy)

SUBMITTED: 00 ENCL: 00 SUB CODE: NP

NO REF SOV: 005 OTHER: 004

Card 3/3

L 10330-67 EWT(m)/EWP(t)/ETI IJP(c) [illegible]

ACC NR: AP6029795 (N) SOURCE CODE: UR/0089/66/021/002/0092/0096

60

AUTHOR: Pravdyuk, N. F.; Vikhrov, V. I.; Pavlov, B. Yu.; Perevezentsev, V. N. 57

ORG: none

TITLE: Determination of the burnup of the fuel element of the icebreaker "Lenin" from the Cs-137 activity without chemical separation

SOURCE: Atomnaya energiya, v. 21, no. 2, 1966, 92-96

TOPIC TAGS: reactor fuel element, cesium, uranium compound, enriched uranium, reactor neutron flux, gamma neutron reaction

ABSTRACT: The authors determined the distribution of the burn-up along the length of the fuel element by measuring the intensity of the 0.66-Mev gamma lines of the Cs^{137} in the reaction products with a scintillation γ spectrometer with resolution 10--12%. The fuel element tested was made of uranium dioxide with 5.5% enrichment, operated for 428 effective days, and stored for 575 days after removal from the reactor. It was cut in the hot chamber in 11 places and two samples of the uranium dioxide were chosen from each cut. The activity was measured with a scintillation counter in a specially designed pickup (Fig. 1) and the data were processed with a pulse-height analyzer (AI-100) provided with a special information extraction system (VD) developed at the Institute of Atomic Energy im. I. V. Kurchatov by M. P. Sokolov. The calibration of

UDC: 621.039.548

Card 1/2

L 10330-67

ACC NR: AP6029795

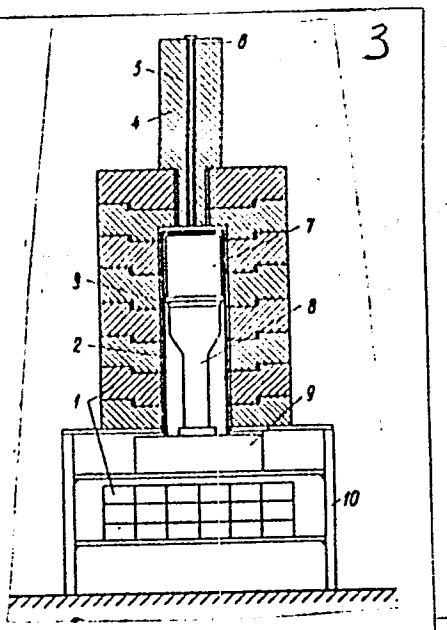


Fig. 1. Diagram of gamma-spectrometer pickup. 1 -- Lead shield, 2 - jacket, 3 - light pipe, 4 - collimator, 5 - copper tube, 6 - target, 7 - NaI(Tl) crystal, 8 - photomultiplier, 9 - cathode follower, 10 - support

the apparatus and the processing of the results are described, and the integral flux of the thermal neutrons and the burnup rate are calculated. It is concluded that the method can be used to determine the relative distribution of the burnup, after suitable cooling of the fuel element with accuracy ±6% and the absolute burn-up value with accuracy ±16%. The authors thank N. M. Mordvinov for a discussion of the results, and A. A. Markov and M. P. Sokolov for practical aid in preparing the system for information extraction. Orig. art. has: 4 figures, 11 formulas, and 2 tables

SUB CODE: 18/ SUBM DATE: 01Feb66/ ORIG REF: 006/ OTH REF: 001

Card 2/2 RP

PRAVDYUK, V.V.; kand. voyen.-morskikh nauk; SOKOLOV, A.V.

Velocity losses of ships under the effect of hydrometeorological conditions. Inform. sbor. TSNIIMF no. 120. Sudovozh. i sviaz' no. 27:42-47 '64 (MIRA 19:1)

[illegible], Vladimir Ivanovich. Prinimal uchastiye [illegible]AVDYUK, V.V., st. nauchn. sotr.

[The Loran pulse-type radio navigation system] Impul'snaia radionavigatsionnaia sistema "Loran." Moskva, Izdvo "Transport," 1964. 131 p. (MIRA 17:5)

1. TSentral'nyy nauchno-issledovatel'skiy institut morskogo flota (for Travdyuk).

BYKOV, V.I., kand.tekhn.nauk; PRAVDYUK, V.V., kand.voyenno-morskikh nauk

Use of radio navigation systems (RNS) for navigation on approaches to harbors, on canals and in narrows. Trudy TSNIIMF 3 no.47: 3-15 '63. (MIRA 16:12)

DANILOV, L.; KAMENSKIY; SOKOLOV; PRAVDYUK, Ya.

Eliminating excessive load testing of bridge cranes Comments on an article by S.N.Ryzhov. Metallurg 10 no.4:31 Ap '65. (MIRA 18:7)

1. Glavnyy mekhanik Cherepovetskogo metallurgicheskogo zavoda (for Danilov). 2. Ispolnyayushchiy obyazannosti glavnogo mekhanika Taganrogskogo metallurgicheskogo zavoda (for Kamenskiy). 3. Nachal'nik byuro tekhnicheskogo nadzora Otdela glavnogo mekhanika Taganrogskogo metallurgicheskogo zavoda (for Sokolov). 4. Glavnyy mekhanik Krivorozhskogo metallurgicheskogo zavoda (for Pravdyuk).

L 08936-67 EWT(m)

ACC NR: AP6016050 SOURCE CODE: UR/0185/66/011/005/0563/0565

AUTHOR: Korzh, I. O.; Mishchenko, V. O.; Pravdyvyy, M. M.; Prykhod'ko, V. P.; Sklyar, M. T.; Tots'kyy, I. A. 50

ORG: Institute of Physics, AN UkrSSR, Kiev (Instytut fizyky AN UkrSSR)

TITLE: Measurement of angular distribution of neutrons with energies of 0.3, 0.5, and 0.8 Mev in elastic scattering on titanium and cobalt nuclei

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 11, no. 5, 1966, 563-565

TOPIC TAGS: angular distribution, elastic scattering, neutron scattering, scattering cross section, titanium, cobalt, nuclear energy level, nucleus

ABSTRACT: These measurements were carried out because the available data on angular distribution in elastic scattering of neutrons with energies of less than 1 Mev are inadequate for calculating the mean nuclear physical constants with sufficient accuracy. The measurement results are given in the accompanying table from which it is seen that the data on the total cross section obtained by calculation are in good agreement with the experimental data (column 3) obtained by D. Hughes and J. Harvey (Neutron Cross Section, Second Edition, BNL-325, 1958). Orig. art. has: 2 formulas, 2 figures, and 1 table.

Card 1/2

L 08936-67

ACC NR: AP6016050

Element	Energy of neutron from photoneutron source E_n, Mev	Total cross section σt, barn	Total cross section σt, barn calculated	Elastic scattering cross section σe, barn	$\overline{\cos \Theta}$	Transport cross section at elastic scattering σtre, barn
Ti	0.3	2.79	2.85	2.69±0.19	0.14±0.02	2.30±0.22
	0.5	2.42	2.72	2.57±0.10	0.17±0.01	2.12±0.12
Co	0.5	4.48		4.77±0.24	0.13±0.01	4.14±0.27
	0.8	3.42	3.54	3.73±0.26	0.21±0.03	2.94±0.32

Card 2/2 nst SUB CODE: 20/ SUBM DATE: 12Jan66/ ORIG REF: 003/ OTH REF: 004

KREN, Emil; PRAVECZKI, Endre

Classifying magnetic structures and the method for determining the neutron diffraction. Magy fiz folyoir 12 no.4:387-414 '64.

1. Solid Physics Laboratory, Central Research Institute of Physics, Hungarian Academy of Sciences, Budapest.

PR/ VECZKI, Endre

Electric resistance of ferromagnetic substances. Koz jiz kozl MTA 13 no.1:27-31 '65.

1. Submitted November 3, 1964.

PRAVEDNIKOV, A. N.

Dissertation: "Some Characteristics of the Kinetics of Extensive Polymerization of Vinyl Compounds." Cand Chem Sci, Sci Res Physicochemical Inst imeni L. Ya. Karpov, Moscow, 1953. (Referativnyy Zhurnal--Khimiya, Moscow, No 6, Mar 54)

SO: Sum 243, 19 Oct 54

PRAVEDNIKOV, A. N.

2

M. A. 40UT2
2 cop: CS

Some characteristics of vinyl compound polymerization reactions. The viscosity effects of the polymerizing system upon the polymerization kinetics. A. N. Pravednikov. *Voprosy Khim. Kinetiki, Kataliza i Reaktsionnoi Sposobnosti, Akad. Nauk S.S.S.R.* 1955, 322–37.—A discussion of results in recent Russian and foreign literature on the vinyl compound polymerization. W. M. Sternberg

PRAVEDNIKOV, A. N.

4 6 2

Polymerization of chloroprene in presence of ω-polymer. A. N. Pravednikov and S. S. Medvedev (*Doklad. Akad. Nauk SSSR*, 1955, ~~108, 131—134~~).—Between 5 and 25° the rate of polymerization of chloroprene to vitreous ω-polymer is expressed by $dW/dt = kW$, where W is the wt. of polymer. Strains arising in the polymerizing mass lead to rupture of polymer chains, with formation of free radicals, the no. of which (n) is proportional to W, whence $dn/dt = k'n$. At temp. exceeding the vitrification point, the rate of extinction of free-radical reaction chains rises, owing to lowered η of the mass, and the rate of formation of active centres of initiation of chains is expressed by $dn/dt = k'n - k_0n^3/V$, where V is vol. of polymer.

R. TRUSCOE.

2

M. A. YOUTZ
2 copies

RM 6/4

Sci-Res Inst. Phys-Chem Inst. im. L. Ya. Karpov, Moscow

PRAVEDNIKOV, A.M.; MEDVEDEV, S.S.

Study of the chloroprene ω-polymerization mechanism by means of labelled atoms. Dokl. AN SSSR 109 no.3:579-581 Jl '56.
(MLRA 9:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Medvedev)
(Chloroprene) (Carbon--Isotopes)

PRAVEDNIKOV, A.N.

USSR/ Chemistry of High-Molecular Substances F.

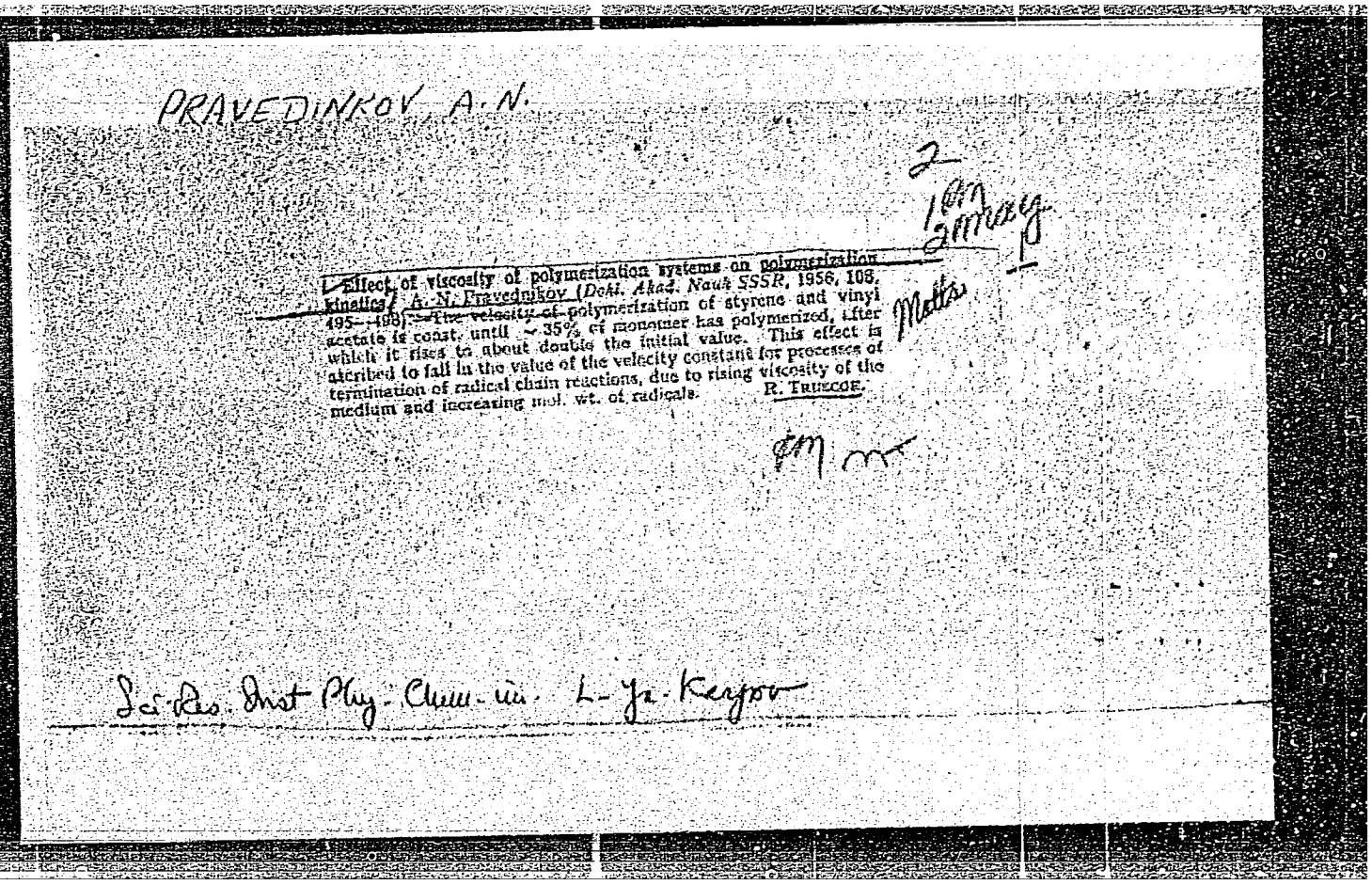
Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11943

Author : Pravednikov A.N.
Inst : Academy of Sciences USSR
Title : Effect of Viscosity of the Polymerization System on Polymerization Kinetics

Orig Pub : Dokl. AN SSSR, 1956, 108, No 2, 495-498

Abstract : See also RZhKhim, 1956, 22623

Card 1/1



PRAVEDNIKOV, A. N.

2
16th
2 May

Effect of viscosity of polymerization systems on polymerization kinetics. A. N. Pravednikov (*Doki. Akad. Nauk SSSR*, 1956, 108, 495–498).—The velocity of polymerization of styrene and vinyl acetate is const. until ~35% of monomer has polymerized, after which it rises to about double the initial value. This effect is ascribed to fall in the value of the velocity constant for processes of termination of radical chain reactions, due to rising viscosity of the medium and increasing mol. wt. of radicals. R. TRUSCOE.

Matts

fm

Lab. Res. Inst. Phys. Chem. im. L. Ya. Karpov

Pravednikov, A. N.

1 - gwm

Investigation of the ω-polymerization mechanism of chloroprene by the tagged atom method. A. N. Pravednikov and S. S. Medvedev. *Doklady Akad. Nauk S.S.S.R.* 109, 579–81(1956).—The ω-polymerization process which results in the rupture of C-C bond polymer chains was studied experimentally. To accomplish it C^{14}-contg. chloroprene was synthesized, in which the ω-polymer nucleus was produced in the usual way, and the radioactivity distribution in the polymer was investigated: its polymerization process without any C-C bond rupture would cause only the polymer outer part to be radioactive; if there is a rupture the whole polymer would be radioactive. These results, and the results given earlier (*C.A.* 50, 4543*f*) permit the description of the chloroprene polymerization process as proceeding by an anion mechanism and also with a ω-polymer formation by radical formation through the rupture of polymer mols.

W. M. Sternberg

RM abs
RM 1

PRAVEDNIKOV, A. N., and MEDVEDEV, S. S.

"Kinetics and mechanism of chloroprene polymerization," a paper presented at the 9th Congress on the Chemistry and Physics of High Polymers, 28 Jan-2 Feb 57, MOscow, KarpovInst.

B-3,084,395

5(4) SOV/20-122-2-24/42

AUTHORS: Ying Shen-K'ang, Pravednikov, A. N., Medvedev, S. S., Member, Academy of Sciences, USSR

TITLE: On the Mechanism of the Cross Linkage of Polymer Chains Under the Action of Gamma Radiation (O mekhanizme sshivaniya polimernykh tsepey pod deystviyem gamma-izlucheniya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 2, pp 254-257 (USSR)

ABSTRACT: The formation of transverse bonds must be connected with secondary processes in which radicals take part. The velocity of the cross linkage of the chains is constant with respect to time and proportional to the intensity of the radiation. The most simple assumption concerning the mechanism of the cross linkage is the following one: During radiolysis, the transverse bonds are formed by recombination of the polymer radicals to double bonds of the polymer molecules. The steady state with respect to the concentrations of the double bonds and free radicals will be not reached. The recombination of the radicals and the joining-together of the radicals to double bonds play only an unimportant rôle. In order to under-

Card 1/4

stand the mechanism of the processes which lead to the formation of transverse bonds, the radical reactions in the irradiated polymer (especially the reactions in which atomic hydrogen takes part) have to be investigated. This hydrogen atom may either loose its excess energy or react according to one of the following reactions: 1) interaction with an other hydrogen atom: $H + H \longrightarrow H_2$, 2) interaction with free radicals produced during the irradiation

$$\sim CH_2\text{-}\dot{C}H\text{-}CH_2 \sim + H \begin{cases} \nearrow \sim CH_2\text{-}CH_2\text{-}CH_2 \sim \\ \searrow \sim CH_2\text{-}CH{=}CH \sim + H_2 \end{cases}$$

3) interaction with the double bonds: $\sim CH_2\text{-}CH{=}CH \sim + H \longrightarrow$ $\longrightarrow CH_2\text{-}\dot{C}H\text{-}CH_2 \sim$. 4) Detachment of the hydrogen atom from the polymer molecule: $\sim CH_2\text{-}CH_2\text{-}CH_2 \sim + H \rightarrow \sim CH_2\text{-}\dot{C}H\text{-}CH_2 \sim + H_2$. The velocities of these reactions mainly depend on the probability of the collision of the hydrogen atom with the various

On the Mechanism of the Cross Linkage of Polymer Chains Under the Action of Gamma Radiation

groupings. Below the vitrification temperature T_c, the velocities of the cross linkage of polyethylene and polyvinylchloride do not depend on the temperature. In polymers which contain a sufficiently high number of lateral groupings (bokovaya grupirovka), the "cold" hydrogen atoms will take part in the reactions of cross linkage also below the vitrification temperature. In order to prove this assumption, the authors investigated the influence of the γ-radiation on polymers of the structure $\left(-C_3H_6-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_2}{|}}-\right)_n$.

There are 2 figures, 3 tables, and 2 references, 0 of which is Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova
(Physical-Chemical Scientific Research Institute imeni L. Ya. Karpov)

PRAVEDNIKOV, A.N., kand. khim. nauk; LIPATOV, Yu.S., kand. khim. nauk.

[Methods for producing graft and block polymers] Metody polucheniia i svoistva privitykh i blok-polimerov. Moskva, Vses. in-t nauchnoi i tekhn. informatsii, 1958. 34 p. (MIRA 11:9)
(Polymers)

PRAVEDNIKOV, A. N.. YING SHENG KANG, and MEDVEDEV, S. S.

"On the Mechanism of Cross-Linking of Polymer Chains Under Gamma-Irradiation."

paper to be presented at 2nd UN Intl.' Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sept 58.

PRAVEDNIKOV, A.N., kand. khim. nauk; LIPATOV, Yu.S., kand. khim. nauk.

[Methods for producing graft and block polymers] Metody polucheniia i svoistva privitykh i blok-polimerov. Moskva, Vses. in-t nauchnoi i tekhn. informatsii, 1958. 34 p. (MIRA 11:9)
(Polymers)

BUGAYENKO, L.T.; NIKITINA, T.S.; PRAVEDNIKOV, A.N.; MALINSKIY, Yu.M.

[Chemical action of ionizing radiation] Khimicheskoe deistvie ioniziruiushchikh izluchenii. Moskva, 1958. 84 p. (MIRA 12:4)
(Radiochemistry)

5(3), 5(4)

AUTHORS: Aleksandrova, Yu. A., Huang Yü-li, Pravednikov, A. N., Medvedev, S. S. Academician

SOV/20-123-6-20/50

TITLE: Reactions of Oxygen-Containing Radicals of the RO' Type (Reaktsii kislorodsoderzhashchikh radikalov tipa RO')

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 1029 - 1032 (USSR)

ABSTRACT: The reactions under review were carried out mainly on model systems in which the RO'-radicals were formed from the decomposition of dialkyl peroxides. The authors found that at the decomposition of ditertiary-butyl-peroxide, dissolved in hydrocarbons, in addition to methane at 195° the resulting amount of acetone is about 12 times that of tertiary butyl alcohol. This is indicative of a higher activation energy than had been found by J. H. T. Brook (Bruk) (Ref 2). Proceeding from scheme (I), (II), (III), nearly all tertiary butoxy radicals are likely decompose under cleavage of the C-C bond as can be assumed from the results obtained. This is, however, in contradiction to the data published on the "thermal-oxidative" destruction of the carbon chain polymers (Ref 4). It

21(8) PHASE I BOOK EXPLOITATION SOV/2326

Bugayenko, L. T., T.S. Nikitina, A. N. Pravednikov, and Yu M. Malinskiy

Khimicheskoye deystviye ioniziruyushchikh izlucheniy (Chemical Action of Ionizing Radiation) Moscow, 1958. 84 p. (Series: Khimicheskaya promyshlennost') Errata slip inserted. 1,500 copies printed.

Sponsoring Agencies: USSR. Gosudarstvennyy nauchno-tekhnicheskiy komitet, and Akademiya nauk SSSR. Vsesoyuznyy institut nauchnoy i tekhnicheskoy informatsii. No contributors mentioned.

PURPOSE: The book is intended for chemists and chemical engineers.

COVERAGE: The book discusses the effect of ionizing radiation on various chemical processes. The effect of radiation on inorganic and organic compounds, on polymerization in the liquid, gaseous and solid phases, and on the properties of polymers is adequately covered. No personalities are mentioned. There are 495 references: 67 Soviet, 343 English, 16 German, 66 French, and 3 Italian.

Card 1/3

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

TM/fal
9-9-59

AVAILABLE: Library of Congress

Card 5/5

JA/wbc/ec
10-18-60

BAGDASAR'YAN, Khristofor Stepanovich. Prinimal uchastiye: PRAVEDNIKOV, A.N., MEDVEDEV, S.S., otv.red., akademik; BANKVITSER, A.L., red.izd-va; KUZ'MIN, I.F., tekhn.red.

[Theory of polymerization by radicals] Teoriia radikal'noi polimerizatsii. Moskva, Izd-vo Akad.nauk SSSR, 1959. 297 p. (MIRA 12:7)

(Radicals)

YUR'YEV, V.M.; PRAVEDNIKOV, A.N.; MEDVEDEV, S.S., akademik

Effect of side chains on the rate of oxidation of carbon chain polymers. Dokl.AN SSSR 124 no.2:335-337 Ja '59.
(MIRA 12:1)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni L.Ya. Karpova.
(Oxidation) (Polymers)

can be concluded from the results that acetone here is not only formed as a consequence of the reaction :

$(CH_3)_3CO\cdot \xrightarrow{k_1} (CH_3)_2C = O + \cdot CH_3$ (I), but also in consequence of some other reaction the velocity of which considerably depends on temperature. Such a reaction can be that of the RO'-radicals with one another. At low temperatures the concentration of the RO• radicals is low and the reaction proceeds slowly (Ref 2). In order to prove the acceleration of this reaction at increasing temperature or at a considerable increase in concentration of the peroxide, the authors have investigated the decomposition of the di-tertiary-butyl-peroxide in an isopropyl-benzene solution at 120 - 150° and in the concentration range from 4 up to 16 percentage by weight. Figure 1 shows that the ratio of the concentrations of acetone (a) and tertiary butyl alcohol (b) a/b increases with an increasing concentration of the peroxide. Therefore the reaction order of the formation of these compounds with respect to the peroxide concentration is not equal to 1. According to various computations the authors conclude that the acetone

formation under the above conditions at temperatures of about 200° is largely related with the bimolecular reaction:

$(CH_3)_3CO\cdot+(CH_3)_3CO\cdot \xrightarrow{k_4} (CH_3)_2C = O+CH_3-O-C(CH_3)_3$ (IV) and not with the monomolecular decomposition of the RO· radicals. In the case of high-polymers the reaction (IV) must lead to a rapid variation of the distribution regarding the molecular weights. This occurs indeed in the radical stages of the polyethylene oxidation. This variation is accompanied by the occurrence of ether bridges between the macromolecules. There are 4 figures, 1 table, and 5 references, 3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Physical-Chemical Research Institute imeni L. Ya. Karpov)

SUBMITTED: September 29, 1958

5(3)

AUTHORS: Yur'yev, V. M., Pravednikov, A. N., Medvedev, S. S., Academician

SOV/20-124-2-26/71

TITLE: Influence of Side Chains on the Rate of Oxidation of Carbon Chain Polymers (Vliyaniye bokovykh otvetvleniy na skorost' okisleniya karbotsepnykh polimerov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 2, pp 335-337 (USSR)

ABSTRACT: The principal reactions in the oxidation of hydrocarbons are the following:

$R\cdot + O_2 \longrightarrow ROO\cdot$ (1); $ROO\cdot + RH \longrightarrow ROOH + R\cdot$ (2);

$ROOH \longrightarrow RO\cdot + \cdot OH$ (3); $RO\cdot + RH \longrightarrow ROH + R\cdot$,

$\cdot OH + RH \longrightarrow H_2O + R\cdot$ (4). The rates of all these elementary reactions determine the rate of oxidation. As is known the rate is considerably decreased on the transition from low molecular weight to high molecular weight compounds of analogous structure (Refs 1, 2). This might be explained as follows: The removal of one hydrogen atom from the hydrocarbon atom is accompanied by a

Card 1/3

transition of the corresponding link of the molecule from a tetrahedral to a plane configuration. In polymers, links of the polymer chain are displaced. This is bound to increase the activation energy and thus to retard the reaction (as compared with the analogous reactions of low molecular weight compounds). The separation of one hydrogen atom from a side group (methyl-, propyl- and others) is not accompanied by a displacement of the links of the polymer chains and must possess the same activation energy as the corresponding reactions of the low molecular weight compounds. It can therefore be expected that the oxidation of the polymers with comparatively short side chains will take place mainly on the side chains. To control this assumption the authors synthesized polymethylene as well as polymers which contained the methyl and propyl side groups (Ref 4). The experiments concerning the oxidation of these polymers have shown that the introduction of side groups rapidly increases the absorption rate of oxygen (Fig 1,a); at the same time the number of oxygen molecules which are used for the cleavage of the principal chain (Figs 3, 4) increases, i.e. the oxidation really proceeds in the side chains prevalently. At a high oxidation intensity of the polymers which were produced by decomposition

Influence of Side Chains on the Rate of Oxidation of Carbon Chain Polymers

SOV/20-124-2-26/71

of the diazo compounds, a "sewing up" (zashivaniye) of the polymer results as a consequence of ether bridges between the macro-molecules. A very low molecular fraction appears within the system as well. Possibly, these variations are due to the proceeding of a bimolecular reaction under participation of 2 oxygen containing radicals (Ref 6). Polystyrene is not "sewed up" at an oxidation intensity of up to about 20 ml O_2 per 1 g polymer, since the concentration of the radicals and the oxidation rates, respectively, seem to be too low. There are 4 figures and 6 references, 3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Physical and Chemical Research Institute imeni L. Ya. Karpov)

SUBMITTED: September 29, 1958

Card 3/3

PRAVEDNIKOV, A.N.

Effect of polar and steric factors on the reactions of chain transfer and chain growth in polymerization. Probl. fiz.khim. no.2:5-13 '59. (MIRA 13:7)

1. Laboratoriya polimerizatsionnykh protsessov Nauchno-issledovatel'skogo fiziko-khimicheskogo instituta imeni L.Ya. Karpova.
(Polymerization) (Vinyl compounds)

PRAVEDNIKOV, A.N.

To be submitted for the International Symposium on Macromolecular Chemistry, Montreal, Canada, 27 Jul -1 Aug 1961.

USSR

BIRSHTEIN, T. M., Institute of High Molecular Chemistry, Academy of Sciences USSR, Leningrad, jointly with KRIGBAUM, W. R., and KANEKO, M., Duke University, Durham, N.C. - "Elasticity of cube lattice chain networks" (Group 2)

DOGADKIN, Boris A., and DONTSOV, A. A., Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov - "Interaction of polyethylene with sulphur" (Groups 4-5)

KARGIN, Valentin A., Head, Laboratory of Colloidal Chemistry, Scientific Research Physico-Chemical Institute imeni L. Ya. Karpov, Moscow - "The formation of big crystal structures in polymers and their properties" (Group 2. Invited lecture)

KRENTSEL', B. A., TOPCHIYEV, A. V., and [illegible], L. A., Institute of Petroleum, Academy of Sciences USSR, Moscow - "Polymerization of some epoxy compounds" (Group 3-B) (Yu.L)

MEDVEDEV, Sergey S., SPIRIN, YU. A., AREST-YAKUBOVICH, A. A., POLYAKOV, D. K., and GANTMAKHER, A. R., Scientific Research Physico-Chemical Institute imeni L. Ya. Karpov, Moscow - "Polymerization catalyzed by lithium and lithium alkyl" (In German) (Group 3-B)

NAMETKIN, N. S., TOPCHIYEV, A. V., and POLAK, L. S., Institute of Petrochemical Synthesis, Academy of Sciences USSR, Moscow - "On the catalytic polymerization and radiochemistry of allylsilans" (Group 3-A)

PIOTROVSKIY, K. B., All-Union Scientific Research Institute of Synthetic Rubber imeni S. V. Lebedev, Leningrad - "Temperature effect on polymer structure in diene polymerization by alkali metals" (Group 3-B)

PODDUBNYY, I. Ya., and EHRENBURG, Ye. G., All-Union Scientific Research Institute of Synthetic Rubber, Leningrad - "Study of branching in regular isoprene polymers" (Group 1)

PODDUBNYI, I. Ya. MOSEVITSKIY, M.I. RABINERZON, M. A., and FERMOROV, A.M. All-Union Scientific Research Institute of Synthetic Rubber imeni S. V. Lebedev, Leningrad - "Nature of molecular-weight distribution and properties of styrene-butadiene rubbers depending on polymerization conditions" (Group 3-A)

PRAVEDNIKOV, A. N., TELESHOV, Ye. N., YING, She-K'ang, and MEDVEDEV, S. S., Scientific Research Physico-Chemical Institute imeni L. Ya. Karpov, Moscow - "Investigation of the mechanism of radiolysis of polymers containing quaternary atoms of carbon" (Group 4-5) [illegible] V. N.

TSVETKOV, Viktor N., Institute of High Molecular Compounds of the Academy of Sciences USSR, Leningrad - "Stereo-regularity and optical anisotropy of macromolecules" (Group not specified)

USMANOV, Khamdam U., and SUSHKEVICH, T. I., Academy of Sciences UzSSR, Tashkent, Uzbekistan - "The investigation of the cotton cellulose polydispersity according to the molecular weight" (Group not specified)

ENIKOLOPYAN, N. S., Institute of Chemical Physics of the Academy of Sciences USSR, Moscow - "On the kinetics of formaldehyde polymerization and polyformaldehyde degradation" (Group 3-B)

PHASE I BOOK EXPLOITATION SOV/4984

International symposium on macromolecular chemistry. Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii SSSR, Moskva, 14-18 iyunya 1960 g.; doklady i avtoreferaty. Sektsiya III. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-18, 1960; Papers and Summaries) Section III. [Moscow, Izd-vo AN SSSR, 1960] 469 p. 55,000 copies printed.

Tech. Ed.: P. S. Kashina.

Sponsoring Agency: The International Union of Pure and Applied Chemistry. Commission on Macromolecular Chemistry.

PURPOSE: This book is intended for chemists interested in polymerization reactions and the synthesis of high molecular compounds.

COVERAGE: This is Section III of a multivolume work containing papers on macromolecular chemistry. The articles in general deal with the kinetics of polymerization reactions, the synthesis of special-purpose polymers, e.g., ion exchange resins, semiconductor materials, etc., methods of catalyzing polymerization reactions, properties and chemical interactions of high molecular materials, and the effects of various factors on polymerization and the degradation of high molecular compounds. No personalities are mentioned. References given follow the articles.

PRAVEDNIKOV, A. N.

PHASE I BOOK EXPLOITATION SOV/5084

International Conference on the Peaceful Uses of Atomic Energy. 2d, Geneva, 1958.

Doklady sovetskikh uchenykh. [t.4] Khimiya radioelementov i radiatsionnykh prevrashcheniy (Reports of Soviet Scientists. v. 4.: Chemistry of Radio-elements and Radiation Transformations) Moscow, Atomizdat, 1959. 323 p. 8,000 copies printed. (Series: Its: Trudy)

Ed. (Title page): A. P. Vinogradov, Academician; Ed.: V. I. Labaznov; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This collection of articles is intended for scientists and engineers interested in the applications of radioactive materials in science and industry.

COVERAGE: The book contains 26 separate studies concerning various aspects of the chemistry of certain radioactive elements and the processes of radiation effect on matter. These reports discuss present-day methods of reprocessing irradiated nuclear fuel, research in the chemistry of mercury, thorium, uranium, plutonium, and americium, problems related to the sorption and burying of radioactive wastes, the radiolysis of aqueous solutions and of organic compounds, the mechanism of polymer chain grafting, and the effect of radiation on natural and synthetic rubbers. V. N. Prusakov edited the present volume. Most of the reports are accompanied by references. Contributors to individual investigations are mentioned in annotations to the Table of Contents.

TABLE OF CONTENTS:

(31)

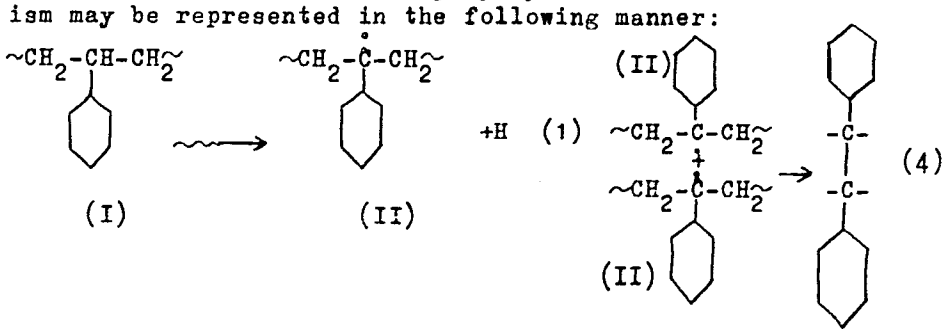
5(3) SOV/20-127-3-33/71

AUTHORS: In Shen-kan, Pravednikov, A. N., Medvedev, S. S., Academician

TITLE: The Mechanism of the Screening Effect of Benzene Rings in the Hydrolysis of Polystyrene

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 3, pp 595-598 (USSR)

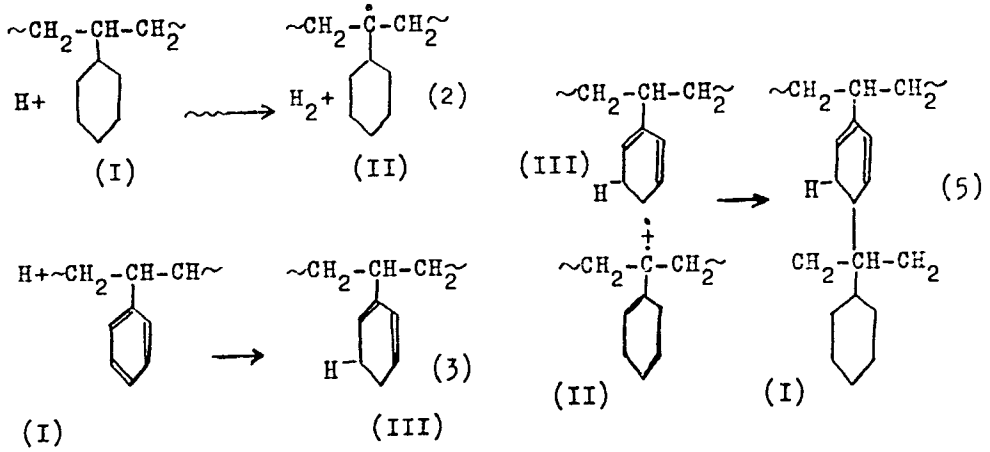
ABSTRACT: Polystyrene has a considerable radiation stability compared to polyethylene and compounds containing no phenyl group. For cross-linking an exceedingly high energy is necessary. In this connection, the reaction is investigated which takes place during irradiation on polystyrene. The reaction mechanism may be represented in the following manner:



Card 1/4

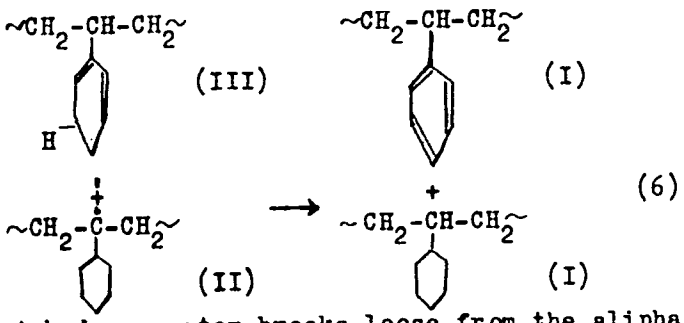
SOV/20-127-3-33/71

The Mechanism of the Screening Effect of Benzene Rings in the Hydrolysis of Polystyrene



Card 2/4

The Mechanism of the Screening Effect of Benzene Rings in the Hydrolysis of Polystyrene



A hydrogen atom breaks loose from the aliphatic chain; it may react with the styrene by a further separation of a hydrogen atom (2), or it may link up to the benzene ring by forming a free cyclohexadienyl radical (3). The latter reaction develops very rapidly. If, further, (II) reacts with (II), a"transversal compound" may be formed (4), or (II) reacts with (III), in which case this reaction may lead to the "transversal compound" (5), and with further disproportionation (6) to the re-formation of the benzene ring. Experiments

SOV/20-127-3-33/71

The Mechanism of the Screening Effect of Benzene Rings in the Hydrolysis of Polystyrene

carried out with deuterium-substituted toluene proved the mechanism mentioned in (6). Data hereon (deuteron content in the compounds obtained and energy used for transition of a D-atom into the benzene ring)are given in table 1. The high stability of polystyrene to cross-linking may be explained by the disproportionation of the primary radicals with the cyclohexadiene radical. There is 1 table and 7 English references.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova
(Scientific Research Institute for Physical Chemistry imeni L. Ya. Karpov)

SUBMITTED: April 17, 1959

Card 4/4

Problemy fizicheskoy khimii

PHASE I BOOK EXPLOITATION SOV/4386

Moscow. Fiziko-khimicheskiy institut

Problemy fizicheskoy khimii; trudy, vyp. 2 (Problems in Physical Chemistry; Transactions of the Institute, no. 2). Moscow, Goskhimizdat, 1959. 202 p. 1,000 copies printed.

Editorial Board: Ya. M. Varshavskiy, Doctor of Chemical Sciences; G. S. Zhdanov, Doctor of Chemical Sciences; V. A. Kargin, Academician; Ya. M. Kolotyrkin, Doctor of Chemical Sciences (Resp. Ed.); S. S. Medvedev, Academician; S. Ya. Pshenzhetskiy, Doctor of Chemical Sciences; V. M. Cherednichenko, Candidate of Chemical Sciences; V. S. Chesalova (Editorial Secretary), Candidate of Chemical Sciences; Ed.: I. A. Myasnikov; Tech. Ed.: Ye. G. Shpak.

PURPOSE: This collection of articles is intended for physical chemists.

COVERAGE: The collection is the second issue of the Transactions of the Scientific Research Institute of Physical Chemistry imeni L. Ya. Karpov. It contains 17 articles which review

Card 1/5

24667

S/081/61/000/009/014/015
B101/B205

5.4600

AUTHORS: Ying Sheng-k'ang, Pravednikov, A. N., Kolmanson, A. E.

TITLE: Investigation of γ-irradiated vinyl polymers by means of electron paramagnetic resonance

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1961, 645, abstract 9P85 (9R85)("Huahsüeh Hsüehpao, Acta chim. sinica", 1960, 26,no.3, 164-168)

TEXT: On radiolysis of polyvinyl chloride (I) and polynitrile acrylic acid, the concentration of free radicals determined by means of epr decreases with rising temperature. (Irradiation was performed below vitrification temperature). The yield of free radicals obtained by radiolysis of (I) is higher than that obtained by radiolysis of polyethylene, whereas the yield of cross links is lower. The authors believe that electrons produced by radiolysis of (I) can be captured by polymer molecules. [Abstracter's note: Complete translation.]

Card 1/1

24668
S/081/61/000/009/015/015
B101/B205

5.4600

AUTHORS: Ying Sheng-k'ang, Teleshov, E. N., Pravednikov, A. N., Medvedev, S. S.

TITLE: Mechanism of the radiolysis of polyisobutylene

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1961, 645, abstract 9P86 (9R86)("Hua-hsüeh Hsüeh-pao, Acta chim. sinica", 1960, 26, no.3, 157-163)

TEXT: The temperature dependence of the rate of destruction and cross linking in the radiolysis of polyisobutylene shows the same character. This is ascribed to the fact that secondary radical reactions play a significant role in the destruction of the polymer. The rate of destruction is slowed down when the polymer is in a swollen state. If swelling takes place in toluene tagged with C^{14}, activity will appear in the polymer after irradiation, while the intrinsic viscosity remains unchanged. The authors believe that this phenomenon is related with the retardation of the reaction of bimolecular disproportionation. Radiolysis of a mixture of low-molecular and high-molecular fractions of

Card 1/2

21668

S/081/61/000/009/015/015

Mechanism of the radiolysis of ... B101/B205

polyisobutylene (low-molecular fraction tagged with C^{14}) causes activity in the high-molecular fraction, too. From this, it is concluded that a bimolecular mechanism might underlie the destruction of the polymer. [Abstracter's note: Complete translation.]

Card 2/2

BEMFORD, K.[Bamford, C.H.]; BARB, U.[Barb, W.G.]; DZHENKINS, A. [Jenkins, A.D.]; ON'ON, P.[Onyon, P.F.]; GRITSENKO, T.M., kand.khim. nauk, [translator]; MILYUTINSKAYA, R.I., kand. khim. nauk, [translator]; PRAVEDNIKOV, A.N., kand. khim. nauk [translator]; MALINSKIY, Yu.M., kand. khim. nauk, red.; KHODETSKAYA, Z.F., red.; PRIDANTSEVA, S.V., tekhn. red.

[Kinetics of vinyl polymerization by radical mechanisms] Kinetika radikal'noi polimerizatsii vinilovykh soedinenii. [By] C.H. Bamford i dr. Moskva, Izd-vo inostr. lit-ry, 1961. 345 p. Translated from the English. (MIRA 15:3)
(Vinyl compound polymers) (Radicals (Chemistry))

PRAVEDNIKOV, A.N.; KARDASH, I.Ye.; BAZOV, V.P.; YELISEYEVA, N.V.; SHARPATYY, V.A.; MEDVEDEV, S.S., akademik

Free-radical polymerization of triazine cycles. Dokl. AN SSSR 151 no.6:1347-1349 Ag '63. (MIRA 16:10)

L 16897-63 EPR/EPF(c)/EWP(j)/EWT(m)/BDS ASD Ps-4/Pr-4/Pc-4 RM/WW/
ACCESSION NR: AP3006596 S/0020/63/151/006/1347/1349 MAY/JFW

AUTHORS: Pravednikov, A. N.; Kardash, I. Ye.; Bazov, V. P.; Yeliseyeva, N. V.; Sharpaty*y, V. A.; Medvedev, S. S. (Academician)

TITLE: Free-radical polymerization of triazine cycles

SOURCE: AN SSSR. Doklady*, v. 151, no. 6, 1963, 1347-1349

TOPIC TAGS: free radical, polymerization, triazine, triazine cycle , free-radical polymerization

ABSTRACT: The present article reports the results of spectroscopic and electron paramagnetic resonance analysis of the polymers obtained by heating triazines with perfluoracetone as a source of CF_3 radicals at 520C. The free-radical polymerization of triazine cycles, evidently representing addition of the free radical to the cycle on the double bond with subsequent opening of the cycle, must be accompanied at high temperatures by depolymerization, by a splitting of the monomeric by a unit from the polymeric radical. Orig. art. has: 1 formula 2 figures.

ASSOCIATION: none

SUBMITTED: 28May63 DATE ACQ: 27Sep63 ENCL: 00
SUB CODE: CH NO REF SOV: 000 OTHER: 000

Card 1/1

research in many facets of physical chemistry, including reaction kinetics, crystallography, spectroscopy, free energy studies, investigations of radiation effects in chemical reactions, low temperature studies, etc. Figures, tables, and references accompany the articles.

TABLE OF CONTENTS:

5 (4), 5 (3)

AUTHORS: Yur'yev, V. M., Pravednikov, A. N., Medvedev, S. S., Academician

SOV/20-125-6-36/61

TITLE: The Influence of Oxidation Products on the Kinetics of the Oxidation of Cetane (Vliyaniye produktov okisleniya na kinetiku okisleniya tsetana)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 6, pp 1301-1302 (USSR)

ABSTRACT: The oxidation of cetane takes place at 140° in a closed system with circulating oxygen. Figure 1 shows that, up to a reaction yield of 25-30 %, the reaction develops autocatalytically, after which it decreases rapidly and continues at a nearly constant rate above a reaction yield of 40-50 %. The concentration of peroxide compounds has a maximum at a reaction yield of 25-30 %, after which it also decreases and becomes nearly constant at a reaction yield of 40-50 %. These phenomena are indicative of the fact that, in the course of oxidation, processes occur which reduce the rate of oxidation. As in the case of hydrocarbon oxidation, the system becomes divided into two layers in the course of the process, an upper layer containing hydrocarbons and a

lower one consisting of oxidation products, products of the lower layer were added to the cetane, which resulted in a reduction of the reaction rate (Fig 3). On the other hand, removal of the lower layer from the reaction vessel caused acceleration of the reaction. This proves that the reduction of reaction rate is caused by the accumulation of products which interrupt the development of the reaction. There are 3 figures.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Research Institute for Physical Chemistry imeni L. Ya. Karpov)

SUBMITTED: February 11, 1959

TELESHOV, E.N.; PRAVEDNIKOV, A.N.; MEDVEDEV, S.S., akademik

Mechanism of polyisobutylene radiolysis. Dokl. AN SSSR 156 no.6: 1395-1398 Je '64. (MIRA 17:8)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni L.Ya. Karpova.

TELESHOV, E.N.; TELESHOVA, A.S.; DESYATOVA, N.V.; PRAVEDNIKOV, A.N.; MEDVEDEV, S.S., akademik

Gas evolution and the formation of double bonds in the radiolysis of polyisobutylene. Dokl. AN SSSR 154 no.6:1402-1405 F '64. (MIRA 17:2)

ACCESSION NR: AP4019980 S/0020/64/154/006/1402/1405

AUTHOR: Teleshov, E. N.; Teleshova, A. S.; Desyatova, N. V.; Pravednikov, A. N.; Medvedev, S. S. (Academician)

TITLE: Gas release and formation of double bonds during radiolysis of polyisobutylene (PIB)

SOURCE: AN SSSR. Doklady*, v. 154, no. 6, 1964, 1402-1405

TOPIC TAGS: gas, double bond, radiolysis, polyisobutylene, Co sup 60, linear electron accelerator, free radical

ABSTRACT: Industrial polyisobutylene films, prepared by evaporation of weak solutions of a polymer in carbon tetrachloride were used. Co^{60} (about 20 000 gm-equivalent Ra) and a linear electron accelerator (200 kev) were the source of ionizing radiation. Before irradiation, the films were evacuated to about 10^{-5} MM Hg during heating to 70C for 24 hours. The degree of destruction was estimated from viscosimetric data. The results indicate that the loss of free radicals in PIB at a temperature above the vitrification temperature is not accompanied by either a formation of gaseous products or the development of double bonds in the

Card 1/2

ACCESSION NR: AP4019980

polymer. Orig. art. has: 4 figs., 2 tables.

ASSOCIATION: none

SUBMITTED: 24Oct63 DATE ACQ: 23Mar64 ENCL: 00

SUB CODE: CH NO REF SOV: 003 OTHER: 005

Card 2/2

L 15706-65 EWG(j), EWT(m)/EPF(c)/EPF(n)-2/EWP(j)/T/EWA(h)/EWA(l) Pc-4/Pr-4/Pu-4/
Peb AFFTC/ASD-3/SSD/RPL/ESD(t)/ESD(gs,/RAEM(c)/ESD(t)/RAEM(i)/SSD/BSD/AFWL/ASD(a)-5/
ACCESSION NR: AP4044277 AS(mp)-2 GG/RM/ S/0192/64/005/004/0627/0629
WW/JTW

AUTHORS: Teleshov, E.N.; Sharpaty*y, V.A.; Pravednikov, A.N.
Medvedev, S. S.

TITLE: Some changes in EPR spectra of irradiated polyisobutylene

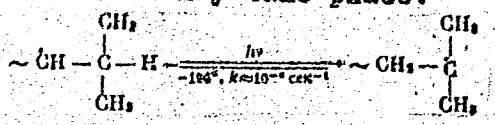
SOURCE: Zhurnal strukturnoy khimii, v. 5, no. 4, 1964, 627-629

TOPIC TAGS: polyisobutylene, electron paramagnetic resonance electron, irradiation, uv. radiolysis, free radical , free radical recombination, polymer radiolysis

ABSTRACT: The irradiation of polyisobutylene (PIB) at liquid nitrogen temperature leads to accumulation of free radicals in it. The EPR spectrum of these radicals is a doublet with approximately 22 oersted splitting which is attributed to $-C(CH_3)_2-\dot{C}H-C(CH_3)_2$ radical (I). In this work an attempt is made to obtain by the EPR method some additional information on the nature and properties of radical products which are formed during radiolysis of PIB. It was found that heating of PIB samples, irradiated with $\sim 10^{22}$ ev/g dose of 1.6 mev electrons at -180 C leads, along with the destruction of primary radicals, to irreversible changes in EPR spectrum. In it the doublet is converted to a spectrum which consists of seven basic lines with addition of

Card 1/3

fine structure. This spectrum may be ascribed to $CH_2-\dot{C}(CH_3)_2$ radical which is produced as a result of addition of isobutylene molecule to radical (I). Isobutylene is produced during radiolysis of PIB. During low temperature radiolysis of PIB radical (II) is not detectable by the EPR method because radicals which are formed during breakage of the radical chain immediately enter recombination and disproportionation reactions. Irradiation of PIB at -60C (above vitrification temperature of the polymer) with simultaneous registration of EPR spectra enables one to find radicals (I) as well as radicals (II). PIB irradiated with UV at -60C for 5 min produces EPR spectrum similar to that of a mixture of PIB and isobutylene irradiated with electrons. It is suggested that under the influence of UV, isomerisation of primary radicals may take place:



Orig. art. has: 3 figures

L 15706-65

ACCESSION NR: AP4044277

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Institute of Physical Chemistry)

SUBMITTED: 28Dec63 ENCL: 00

SUB CODE: OP,NP NR REF SOV: 004 OTHER: 006

Card 3/3

ACCESSION NR: AP4038527 S/0020/64/156/003/0626/0629

AUTHORS: Sharpaty*y, V.A.; Aptekar', Ye.L.; Zakatova, N.V.; Pravednikov, A.N.

TITLE: Radiolysis of polyamides

SOURCE: AN SSSR. Doklady*, v. 156, no. 3, 1964, 626-629

TOPIC TAGS: polyamide, radiolysis, mechanism, kinetics, radical radiolysis product, EPR method, radical mechanism, molecular cleavage, carbon hydrogen bond rupture, butyricbutyroamide, chromophoric group

ABSTRACT: This study was conducted to obtain information about the initial stages of the radiolysis of the polyamides $-CONH(CH_2)_n$ $CONH(CH_2)_m$ or $-CONH(CH_2)_nNHCO(CH_2)_mCONH$ (where n and m can be 4 to 10) and their low molecular analogs. CO and H_2 are formed on radiolysis of polyamides, with the formation of H_2 being independent of radiolysis temperature and proportional to the dosage. The nature and kinetics of the accumulation of radical radiolysis products were studied by the EPR method. The yield of accumulated radicals is almost independent of the type of sample (resin or fiber) or of radiolysis temperature, and increases with the number of methyl groups in

Card 1/3

ACCESSION NR: AP4038527

the polymer chain. The radical -CONHC$^{\alpha}$ HC$^{\beta}$ H_2 is presumed to be formed by rupture of the C-H bond in the methylene groups. The atomic hydrogen reacts with the polymeric material pulling away a hydrogen atom from the α-methylene bonds. On illumination with visible light for 15-20 minutes the EPR spectrum changes sharply, the sample coloring intensity is increased and no gas is evolved. Further illumination has no effect. Apparently the radical formed also exists as CH_2 CONHCH=$CHCH_2$ with the number of the chromophoric groups being retained but rearranged. Mass spectrometric analysis of the radiolysis products of butyroamide of butyric acid led to the assumption of the following radiolysis scheme:

$$C_3H_7-C(=O)-NH-CH_2-C_3H_7 \rightarrow C_3H_7CO-NH-\dot{C}H-C_3H_7 \rightarrow$$
$$\rightarrow C_3H_7-\dot{C}O+NH=CHC_3H_7,$$
$$C_3H_7\dot{C}O \rightarrow C_3H_7^{\cdot}+CO,\ 2C_3H_7^{\cdot}=CH_3CH_2CH_3+CH_3CH=CH_2.$$

Since in the radiolysis of the polyamides and of the low molecular analog the amount of H_2 exceeds that of CO, and the amount of cross-linkage does not cover the difference between the two, it was concluded that H_2 is formed during radiolysis by the radical mechanism and by molecular cleavage from two adjacent carbon atoms or from the

Card 2/3

ACCESSION NR: AP4038527

nitrogen and carbon atoms near the carbonyl group. Thus the processes of H_2 and of CO formation during the radiolysis of polyamides are independent to some degree. "The authors thank M.K. Dobrokhotov, A.V. Sharov, D.M. Margolin, B.V. Maslova and K.G. Yanov for help in the work." Orig. art. has: 1 table, 4 figures and 1 equation.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya Karpova (Physical Chemical Institute)

SUBMITTED: 18Dec63 ENCL: 00

SUB CODE: NP, OC NR REF SOV: 001 OTHER: 005

Card 3/3

KARDASH, I.Ye.; PRAVEDNIKOV, A.N.; MEDVEDEV, S.S., akademik

Thermal degradation of polyethylene terephthalate. Dokl. AN SSSR 156 no. 3:658-661 '64. (MIRA 17:5)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova.

ACCESSION NR: AP4041404 S/0020/64/156/006/1395/1398

AUTHOR: Teleshov, E. N.; Pravednikov, A. N.

TITLE: The mechanism of polyisobutylene radiolysis

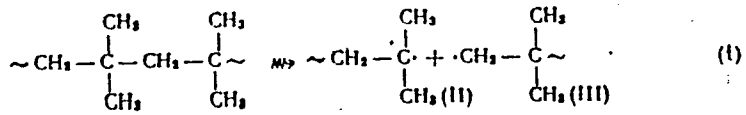
SOURCE: AN SSSR. Doklady*, v. 156, no. 6, 1964, 1395-1398

TOPIC TAGS: polyisobutylene, radiolysis, radiolysis mechanism, isobutylene, free radical formation, EPR spectra, polymer chain rupture, vinyl type double bond, disproportionation reaction, recombination reaction, cross linkage, depolymerization

ABSTRACT: A mechanism for the reactions occurring during the radiolysis of polyisobutylene (PIB) was proposed based on the examination of the free radicals formed by irradiation PIB with cobalt-60 or accelerated electrons (1.6 Mev) at different temperatures under about 10^{-5} mm Hg. The EPR spectra show that at temperatures below about 65C the free radical formation is proportional to the irradiation dosage; at higher temperatures the radical yield is lowered. At liquid nitrogen temperature the radical $C(CH_3)_2$-CH-$C(CH_3)_2$ (I) is formed, but examination of the PIB radiolysis end products indicates other structures are formed which react at lower temperatures.

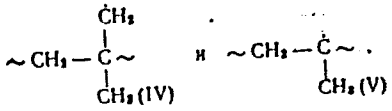
Card 1/3

These result from the rupture of the polymer chain:

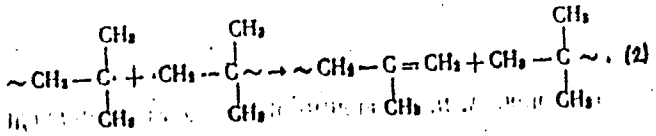


(I)

or breaking off of hydrogen or a methyl group to form:



The formation of the vinyl type double bonds is explained by the disproportionation reaction of II and III at liquid nitrogen temperature:



(2)

ACCESSION NR: AP4041404

Isobutylene is formed by the radiolysis of PIB, the depolymerization increasing only above room temperature. PIB does not cross-link, indicating radicals I, IV and V do not enter a recombination reaction. It is concluded that the destruction of PIB in the early stages of radiolysis proceeds by reaction (1) with subsequent disproportionation (reaction 2). Since reaction (1) is independent of temperature, the temperature dependence of PIB destruction is explained by a change in the relative rate of disproportionation and recombination of radicals II and III at different temperatures. Orig. art. has: 3 figures and 3 formulae.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Research Institute of Physical Chemistry)

SUBMITTED: 26Mar64 ENCL: 00

SUB CODE: GC NR REF SOV: 004 OTHER: 007

Card 3/3

YUR'YEV, V.M.; TELESHOVA, A.S.; APTEKAR', Ye.L.; ARDASHNIKOV, A.Ya.; REZNIKOVA, O.Ya.; PRAVEDNIKOV, A.N.

Use of ion-sorption ESh-1 pumps in the MI-1305 mass-spectrometer. Zav.lab. 30 no.3:375-376 '64. (MIRA 17:4)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut imeni Karpova.